AnnonaceaeCAnnona or custard-apple family

Asimina Adans.

pawpaw

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Growth habit and use. Of the 9 species of the genus *Asimina*, seed data are available only for small-flower pawpaw and pawpaw (table 1). Both form shrubs or small deciduous trees (Vines 1960). Their fruits provide food for wildlife and are also eaten by humans. There is some interest in commercial fruit production of pawpaw, and cultivar selections have been made since the early part of the century (Peterson 1990).

Flowering and fruiting. Flowers of the pawpaws are solitary, perfect, and greenish purple. They appear in the spring during March to May, about the same time as the leaves. In natural stands of pawpaw, pollination and seed set are very poor (Norman and others 1992; Willson and Schemske 1980), conditions that discourage commercial production. In central Illinois, pawpaw averaged 3.5 to 10.5 seeds/fruit (Willson and Schemeske 1980). Pawpaw fruits are 5 to 17 cm long, whereas those of small-flower pawpaw are 5 to 12 cm long (Halls 1973). Pawpaw fruits are greenish yellow before maturity and turn brown to black as they ripen in July to August and fall to the ground in August and September. Seeds of small-flower pawpaw mature while the fruit coat is still green (Norman and others 1992). The fruits are fleshy berries that contain several dark brown, shiny seeds (figure 1). The fleshy part of the fruit is considered edible, but there appear to be 2 different fruit types. Those with white flesh are barely edible, whereas others are larger and have a yellowish or orange flesh with a much better taste (Bonner and Halls 1974). The seeds themselves are oblong, rounded, flat, and bony (figures 1 and 2).

Collection and extraction. Pawpaw fruits should be picked or shaken from the trees as soon as the flesh is soft. The seeds may be extracted by macerating the fruits in water and floating off the pulp, but the entire fruit may be sown (Bonner and Halls 1974). Seed yield, purity, and soundness are as follows (Bonner and Halls 1974; Vines 1960):

	small-flower pawpaw	**pawpaw**
No. of cleaned seeds/weight		
/kg	2,860	1,540
/lb	1,300	700
Purity (%)	98	100
Sound seed (%)	94	96

There is no storage information available on these species.

Germination. Germination is usually very slow because seeds have dormant embryos, and seedcoats are slowly permeable. Moist stratification for 60 days at 5 °C resulted in germination of 50, 62, and 82% for 3 samples of pawpaw seeds (Bonner and Halls 1974). Stratification for 100 days has been recommended, but germination still may be slow and irregular. Fall sowing of untreated seeds does not improve results (Bonner and Halls 1974). No specific test conditions have been reported, but alternating temperatures of 20 °C during the day and 30 °C at night on a moist medium have been satisfactory for most species of the northern temperate zone.

Nursery practice. Pawpaw seeds may be sown in the fall without pretreatment, or stratified and sown in the spring. Seeds should be covered about 20 mm (∶ in) deep. Some shade is helpful to germinating seedlings (figure 3). Another method is to plant fresh seeds, before they dry, in pots of sand and then to keep them in a cool cellar or similar place. As the seeds sprout, they can be picked out and transplanted into nursery beds. Pawpaws can also be propagated by layering and root cuttings (Bonner and Halls 1974) but apparently not by stem cuttings (Dirr and

Heuser 1987).

Literature cited

Bonner FT, Halls LK. 1974. *Asimina,* pawpaw. In: Schopmeyer CS, tech. coord. Seeds of woody plants of the United States. Agric. Handbk. 450. Washington, DC: USDA Forest Service: 238B239.

Dirr MA, Heuser CW. 1987. The reference manual of woody plant propagation. Athens, GA: Varsity Press. 239 p.

Halls LK. 1973. Flowering and fruiting of southern browse species. Res. Pap. SO-90. New Orleans: USDA Forest Service, Southern Forest Experiment Station. 10 p.

Norman EM, Rice K, Cochran S. 1992. Reproductive biology of *Asimina parviflora* (Annonaceae). Bulletin of the Torrey Botanical Club 119: 1B5.

Peterson RN. 1990. Pawpaw (*Asimina*). In: Moore JN, Ballington JR, eds. Genetic resources of temperate fruit and nut crops. Acta Horticulturae 290: 567B600.

Vines RA. 1960. Trees, shrubs, and woody vines of the Southwest. Austin: University of Texas Press. 1104 p.

Willson MF, Schemske DW. 1980. Pollinator limitation, fruit production, and floral display in pawpaw (*Asimina triloba*). Bulletin of the Torrey Botanical Club 107: 401B408.